

# **European Journal of Special Education Research**

ISSN: 2501 - 2428 ISSN-L: 2501 - 2428

Available on-line at: www.oapub.org/edu

doi: 10.5281/zenodo.1172070

Volume 3 | Issue 2 | 2018

# THE INFLUENCE OF VISUAL ARTS EDUCATION ON CHILDREN WITH ASD

Ayşe Çevirgen<sup>1</sup>, Burcu Aktaş<sup>2</sup>, Mehtap Kot<sup>3i</sup>

<sup>1</sup>Art Teacher, Science and Art Center, Turkey <sup>2</sup>Research Assistant, Abant İzzet Baysal University, Faculty of Education, Special Education Department, Turkey <sup>3</sup>Research Assistant, Abant İzzet Baysal University, Faculty of Education, Special Education Department, Turkey

#### **Abstract:**

The aim of this research is to examine the effects of visual arts on a child with Autism Spectrum Disorder (ASD). The research included a 13-years-old male student with ASD, the student's parents, and the visual arts teacher. The research was designed according to the case study from qualitative research models. Semi-structured interviewing and portfolio analysis techniques were used to collect research data. The findings of the research show that the visual arts course has positive effects on the child with ASD.

**Keywords:** Autism Spectrum Disorder, visual arts, portfolio, portfolio file evaluation.

#### 1. Introduction

Visual arts education; is one of the most reliable environments in which creativity training is held in the foreground, and is guided by the personal development and pertinence of each student (Fussy and Fussy, 2012). Visual arts education aims to educate people, to create humanistic, creative and constructive individuals who are interested in enjoying life happily, enjoying life, having aesthetic environment consciousness, developed visual sense, and expressing themselves (Türe, 2007). When viewed as an educational tool, visual arts education is the most effective means of providing integrity between perception, thinking and practice (Türe, 2007). Children who cannot express their emotions in verbal tongue are able to express themselves with artistic activities and reach their satisfaction by creating new products that are unique to them (Ulutaş and Ersoy, 2004, Çelik, 2009). In addition, children use hand-eye coordination (Edwards and Nabors, 1993) and fine-coarse motor muscle development

<sup>&</sup>lt;sup>i</sup> Correspondence: email mehtapkot@ibu.edu.tr

(Ozcan, 2015) to use the necessary materials such as scissors, paint and brush during visual arts training. As the entrepreneurship and creativity feelings develop in the place where the art is developed, the artworks made as a group provide the children to plan and implement things in cooperation. (Ulutaş and Ersoy, 2004). Visual arts education is individual and allows each individual to do something new by interpreting their own mental accumulation (Türe, 2007). For this reason, visual arts education should not be viewed only for those with special abilities, but should be seen as an educational process involving all age groups and children from the beginning of the school year (Aral, 1999).

Visual arts education is also important in the education of children affected by inadequacy as much as it is important for normally developing children. Special needs individuals; visual arts education is important in terms of their sense of success, their adaptation to social life, their emotional qualities, the development of their perceptions, their expressive skills and creativity, their coordination of hand-eye-mind coordination and their integration with society (Turan 2004; Çağlayan, 2014; Salderay, 2014).

In terms of special needs individuals, the main aim of visual arts education is to contribute to the individual development of the child rather than to create a work of art, to improve the behavior and skills that the child exhibited during the work as well as the product (Erim and Çaferoğlu, 2012; Şahin, 2007; Çağlayan, 2014). The visual arts education is crucial to the education of the special needs individuals (Turan, 2004; Şahin, 2007), which has a wide range of applications addressing more than one development field and allows individuals to freely transfer their feelings and thoughts in a relaxed and peaceful environment. However, it is also thought that visual arts will enable individuals to realize themselves, to contribute to the development of individual self-esteem, and to be able to act independently in certain areas (Sahin, 2007). A consciously planned visual arts lesson not only allows individuals to enjoy their work, but also increases their cognitive skills. In the course of their work, the visual arts provide guidance and information by the teacher to have knowledge about many subjects such as the structural features, measures, colors of the objects that individuals meet in daily life (Çağlayan, 2014). In visual arts education, not only in the process of product creation but also in the process of product exhibition, special needs individuals acquire new skills and develop social communication skills (Salderay, 2010). Also, depending on the liking of the followers of the product, the attitudes and thoughts towards special needs individuals can also change (Salderay, 2010).

Studies conducted with individuals with different intellectual skills clearly reflect the positive effects of visual arts lessons on individuals with special needs. When the effects of these studies are examined; visual arts, artistic skills (conceptual / linear structure) creativity, visual perceptions, aesthetic appreciation levels, development of skills to start and finish an activity, self-expression, helping with friends, communication establishing social skills such as participation in group activities, and behaviors that can be counted as problems during activities are not displayed (Paksoy, 2003; Köse, 2005; Bayraktar, 2007; Adan, 2009; Bolu, 2010; Salderay, 2010, Aksu, 2011, Artut, 2013).

Group interactions for children who are diagnosed with Autism Spectrum Disorder (ASD), which is a frequent problem in the field of social communication, make a great contribution to the education of these children (Eliçin and Yıkmış, 2015; Yıkmış and Özbey, 2009). Because peer interaction is a science-based intervention for the social and communicative problems of children with, it is extremely important that they can meet with their normally developing peers and perform different artistic activities (Şenel, 2009) and facilitate learning in a positive environment by influencing the child's all developmental areas (Erim and Caferoğlu, 2012). However, the feeling of happiness and self-esteem is made possible by the feeling of the student making a product by him, and it allows the student to want to share his product with the environment (Doğutaş, 2017). In this sense, the student initiates interaction with other individuals, develops his / her self-expression skills and socializes. Studies examining the effects of visual arts lessons on children with ASD indicate that children with ASD are happier and more peaceful after the visual arts lesson and that they are less aggressive (Bayraktar, 2007; İkiz, 2007).

Generally speaking, visual arts education is an important field. This area is for the reason that the exit point of art is human soul; the child prepares an environment for the unknown. Art, in particular, reflects the imagination of children. They make them gain self-confidence. It helps them make decisive decisions in the context of freedom and authenticity. For these reasons, the importance of art education in children is great. The aim of this research is to develop a visual arts course for a child diagnosed with ASD, and to determine the opinions of the student, the family of the student, the visual arts and the classroom teacher.

The aim of this research is to examine the effects of visual arts on a child with autism spectrum disorder;

- a) to the student's portfolio file,
- b) to the views of the learner,
- c) In the opinion of the parents,
- d) The evaluation of the teacher according to their opinions.

#### 2. Method

This research was designed according to the case study from qualitative research models. In the case study, one or more cases are investigated in depth and the factors related to the situation are evaluated with a holistic approach (Yıldırım and Şimşek, 2005).

#### 2.1. Participants

A 13-years-old male student with ASD participated in this research. In order to obtain information about the student, interviews were held with the student's parents and visual arts teacher.

## 2.2. Implementation Phase

In this section, visual arts teacher between 20.10.2016 - 04.05.2017 between the ASD students and the visual arts lessons in the planning and implementation of the activities were discussed. All the activities that the student made at this stage were stored in chronological order and brought the portfolio file to the stage.

Table 2.1: Implementation plan

No	Activity	Start Date	End Date	Explanations
110	<i>J</i>			1
1	Presentation of Color	20.10.2016	27.10.2016	Warm and cold colors were worked.
	Concept			
2	Kneading and shaping	03.11.2016	24 2016	Clay work was done.
	work			
3	Linear Studies	01.12.2016	29.12.2016	In line work, a ruler was used and lines were
				created from the lines.
4	Composition with	05.01.2017	19.01.2017	
	Linear Studies			
5	Paper Folding Studies	09.02.2017	23.02.2017	Quilling techniques have been applied in paper
				folding studies.
6	Printing Techniques	02.03.2017	30.03.2017	Printing work was done with balloon printing,
	-			eva sponge paper printing works.
7	Waste Material Studies	06.04.2017	04.05.2017	Designs were created by painting waste jars.
,	, , dete i i decidi e cadice	00.01.2017	01.00.2017	2 congres were created by punting waste juris.

# 2.1.1. Color Concept Activity

The concept of color is organized in order to relate colors and senses. In order to grasp the hot and cold colors, the student made an activity with acrylic paint. It is said that warm colors are the colors of the sun in order to be permanent. A sun picture is made from warm colors. The cold colors were said to be blue, green and purple, and the sun rays were made of cold colors and lines.





# 2.1.2. Kneading and Shaping Activity

The outward appearance of emotions in autism is provided by typical body movements. This shows that there may be a deep relationship between movements and feelings and emotions. With kneading and shaping work, it is aimed to address the touch and visual senses of learners and to ensure their integration. Clay was selected as a kneading material and information on the use of clay was given. This information was

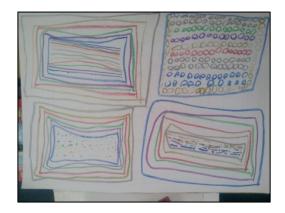
given while the student was still working and auditory stimulation was also provided. The subject to be worked on has been identified as a lotus flower, resulting in successful work.





#### 2.1.3. Linear Studies

In order to improve hand eye co-ordination with small muscles, line work has been done by drawing lines between two designated points and forming shapes. This study also aimed at the development of attention skills.





## 2.1.4. Composition with Linear Studies

The yarns stretched on the cardboard were covered with picture paper and linear works were made between the formed geometrical figures. It is aimed to achieve three dimensional perceptions by composing composition after two dimensional linear study.

#### 2.1.5. Folding Paper

By learning the folding and folding of the paper properly, shapes were formed from the folding units. The student has continued to work diligently.



## 2.1.6. Printing Techniques

Printing work was done with balloon printing, eva sponge paper printing works. Balloon printing was done using a small balloon because it was fear of balloon.



#### 2.1.7 Waste Material Studies

In our work, we were informed about the technique before dyeing jars and designing. When he started working, he ended his job by telling his ideas about the design that was careful to be meticulous and clean.



#### 2.3. Collection of Data

Semi-structured interview and portfolio analysis techniques were used to collect research data. Interviewing is a frequently preferred data collection tool for collecting data in qualitative research methods. In order to evaluate the effects of the visual arts lesson on the child, which is an ASD in the research, the student was interviewed with the visual arts teacher, class teacher, family and the child himself. The interviews were organized as a one-on-one interview at the student's home. Before preparing the interview questions, the related articles were scanned and interview questions were set. Expert opinions on the prepared interview questions were taken and the interview questions were finalized.

Portfolio review is; is the accumulation of studies that students make in one or more of the field to determine their development and chronologically (Mamur, 2012). In this research, a portfolio file was created by accumulating the products that a student with ASD had made in visual arts course between September 2016 / June 2017 according to chronological order. The portfolio file has been evaluated according to the checklist prepared by the field expert. Checklist; visual arts are prepared according to the course achievements. Expert opinion on the prepared checklist has been obtained.

# 2.3. Analysis of Data

In the study, the data obtained by the semi-structured interview technique were analyzed by content analysis technique. Negotiations with the research participants were published in the article without any change. The consistency of the obtained text was checked by other researchers. The research data were independently coded by two different researchers, and the resulting codes were compared and reviewed to generate a code list and codes to support the codes. The codes created afterwards are grouped under the themes and interpreted together with the quotations.

A checklist has been prepared by the field expert to examine the data obtained by the portfolio review technique in the study. The checklist is based on the achievements of the visual arts course and the developmental level of the student.

## 3. Findings

The findings of this research, in which the effects of visual arts lesson on a child with ASD were examined, were examined under three headings: parent and teacher views, views of ASD learners and portfolio file evaluation. The opinions of parents and teachers and the students of ASD are divided into different themes within themselves.

#### 3.1. Parents and Teacher Opinions

The findings of the interviews with the parents of the child with ASD and the teacher were collected under four main themes:

1. Theme: Views on visual arts lesson

Mothers and fathers who participated in the research stated that visual arts lesson is a lesson that enhances children's confidence, contributes to hand skills and increases their belief that their children can be successful. The visual arts participating in the research are beautiful, that all of the labor is done, that the visual arts teacher participated in the research, the visual arts course contains many different types of material, that work can be done in very different numbers and shapes, the boundaries of the course are flexible, the student can choose the activity he wants freely and according to his own

#### Ayşe Çevirgen, Burcu Aktaş, Mehtap Kot THE INFLUENCE OF VISUAL ARTS EDUCATION ON CHILDREN WITH ASD

imagination and skill philosophy. For this reason, he pointed out that the visual arts course enhances the confidence of the student, he feels success, especially develops social skills and motivates more.

### 2. Theme: Effects on interaction with children

Mothers and fathers who participated in the research indicated that their children showed pictures that they did as soon as they came home from school and they began to tell their paintings, that they were very excited and happy when they told their paintings, that they had more time to talk about things and that their communication with their children became stronger.

The visual arts teacher who participated in the research stated that the most important change she observed about the student was in the social skills, that the student was a child sitting in her own class at the beginning, not wanting to participate in her studies, and putting her stuff in her bag in half of the class. When you are painting, you start talking to the student in many different ways, plastics, talking about animals, and talking about problems that they sometimes have at home. The visual arts teacher also stated that during the activities there were directives about the student's daily life. It is also the findings of this research that, in the classroom, they started to look at the pictures of the students' friends, took their own ideas and tried them in their own paintings, and that their friends started getting ideas from their paintings and started joking with their friends.

# 3. Theme: Effects on people's attitudes

The visual arts participating in the research stated that the teacher had a different success in each study and that their friends were aware of this situation and started to make comments such as "The Ansar was very beautiful" and that their sharing increased. In addition, as the work of the students increased, the fact that they opened an individual picture exhibition at the end of the term, this exhibition was very good for the other teachers and students in the school, and the attitudes towards the students and the points of view changed positively.

The parents of the learners stated that the visual arts course, especially the exhibition which the children opened personally at the end of the semester, was very influential on the attitudes of the people. In relation to this, parents; "After the teachers' perspective changed. Everyone could not believe it. They said they did this. - Immediately after his exhibition, he immediately took it all over the house. Everyone wants to show up now. He invites his neighbors. He calls people around us to see the pictures. Then he wanted to take the dog. I call the neighbors in the village because I see the pictures of hani exhibitions. Everyone could not believe it. People are prejudiced. They caused them to behave more positively. "They expressed their opinions about their attitudes.

## 4. Theme: Other classroom activities

The parents who participated in the research stated that their children started to go to the school more eagerly, especially the days when the visual arts lesson was very excited and they went to the school without any problems at home. They also stated that their grades have risen and they have received a Certificate of Appreciation. The visual arts participating in the research did not talk much about the success of the other teachers and the students but stated that the problem behaviors of the students were not mentioned in the teachers' room anymore.

# 3.2. Opinion of Students with Autism Spectrum Disorders

Findings from interviews with students with ASD were collected under three main themes:

#### 1. Theme: Views on visual arts lesson

One of his favorite lessons is visual arts lesson, this derste mentioned that they looked at the pictures from the intelligent throne, they made their paintings, they made abstract and concrete pictures, they made graphite. He also said that all these events are fun and he feels good. He also stated that his teacher told him that he could change the paintings and that he liked to change shapes and other forms, to be a painter in the future and to publish his paintings on the internet.

## 2. Theme: Most preferred activities and materials

The student stated that his favorite colors are yellow and metallic colors / shining bright colors, he likes to paint with gouache paint more. Looking at the events, he said that he would be able to draw almost everything but he likes to hang birds such as budgerigar and Indian nightingale. He also said that he likes to paint when he is happy and he likes to work at the workshop because there is more activity.

## 3. Theme: Effects on interaction with other people

She stated that at the end of the course of visual arts she opened a painting exhibition and that everyone was happy to see the pictures she made. In relation to the painting exhibition, he stated that his friends, his family thought they were good things and they were happy. Student "I was happier and calmer as I started painting. My mother says that I am calmer, "she said in a statement to her mother. He and his friends, along with their classmates, stated that they were looking at pictures on the smart board, drawing pictures together, helping them choose pictures, liking their own pictures, and not making them all as good as themselves.

## 3.3. Findings of Portfolio File Evaluation

The pictures that the learner made before receiving individual education are shown below. When the first pictures made by the student are examined, it is seen that the concept of color is not obtained and the drawings are technically incorrect. Color shifts and the use of picture materials have not been clearly understood.









The studies of the individual after the individual education are shown below. After the work done, it was observed that the student could express himself in concrete and abstract painting, learned to use painting techniques and changed color preferences.







#### 4. Conclusions and Recommendations

In the visual arts course, the learning environment is relaxed and pleasant and offers various expression methods in terms of feelings and thoughts to the individual. During the lessons, the sharing of children with each other, making explanations about the concepts in question, explaining children about themselves and their studies, talking about the activities they want to use and do contribute to their development of social skills and self-expression skills (Turan, 2004; 2007). In addition, there is no single and definite truth about the studies carried out in visual arts lesson. For this reason, the visual arts course is a work process in which the child initiates and ends a work without any anxiety (Sahin, 2007).

Parallel to the information on the field, the data obtained from this research show that the visual arts course has positive effects on the child with ASD. When we evaluate from the point of view of parents and teachers; the visual arts course is one of the research findings that contributed to the child with ASD especially social skills, that the student was more harmonious and calm, strengthened his interactions with the people, contributed to the interest and success of the students in other courses and positively influenced attitudes and thoughts of other people. From the perspective of the child with ASD, the research findings are that visual arts lessons are fun and pleasing, allow different and new things to be tried, and increase their sharing with their friends.

#### References

1. Adan, A. (2009) Görsel Sanatlar Eğitiminin Down Sendromlu Çocuklar Üzerindeki Etkileri (Diyarbakır Örneği), Yayınlanmamış Yüksek Lisans Tezi, Malatya: İnönü Üniversitesi.

#### Ayşe Çevirgen, Burcu Aktaş, Mehtap Kot THE INFLUENCE OF VISUAL ARTS EDUCATION ON CHILDREN WITH ASD

- 2. Aksu, M. (2011) Zihinsel Engelli Çocuklarda Görsel Sanatlar Eğitiminin Motor Beceri Gelişimine Katkısı, Yayınlanmamış Yüksek Lisans Tezi, Bursa: Uludağ Üniversitesi.
- 3. Aral, N. (1999). Sanat Eğitimi-Yaratıcılık Etkileşimi. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 15, 11-17.
- 4. Bayraktar, E. (2007) Görsel Sanatlar Eğitiminin Otistik Çocuklar Üzerindeki Etkileri, Yayınlanmamış Yüksek Lisans Tezi, Ankara: Gazi Üniversitesi.
- 5. Bolu, H. (2010) Zihinsel Engelli Çocukların Gelişmesinde Sanat Eğitimi Derslerinin Katkısı, Yayınlanmamış Yüksek Lisans Tezi, İstanbul: Marmara Üniversitesi
- 6. Buyurgan, S., & Buyurgan, U. (2012). Sanat eğitimi ve öğretimi (Üçüncü Baskı). Ankara: Pegem A Yayıncılık.
- 7. Çağlayan, N. (2014). Zihinsel Engelli Bireylerin Eğitiminde Görsel Sanatlar Dersinin Yeri ve Önemi. *Karabük Üniversitesi Sosyal Bilimler Enstitüsü Dergisi* 4 (1), 91-101.
- 8. Çelik, A. (2009) Zihinsel Engelli Öğrencilerin Görsel Sanatlar Dersindeki Öncelikli Renk Tercihleri, Yayınlanmamış Yüksek Lisans Tezi,Bolu: Abant İzzet Baysal Üniversitesi.
- 9. Doğutaş, A. (2017). Özel Eğitim Kurumlarındaki Görsel Sanat Eğitim Uygulamalarının Öğretmen Görüşleriyle Değerlendirilmesi. Yayımlanmamış Yüksek Lisans Tezi, Yakın Doğu Üniversitesi, Eğitim Bilimleri Enstitüsü, Lefkoşa.
- 10. Edwards, L.C. ve Nabors, M.L. 1993. The Creative Art Process: What It is and What It is not. Young Children, 48(3); 77-81.
- 11. Eliçin, Ö. Ve Yıkmış, A. (2015). Otizmi Olan Öğrencilere Okuma Yazma Öğretme Konusunda Sınıf Öğretmenlerinin Görüş Ve Önerileri. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, 15(Özel Sayı), 231-242.
- 12. Erim, G. Ve Caferoğlu, M. (2012). Görsel sanatlar eğitimi dersinin zihinsel engelli çocuklara katkısının özel eğitim öğretmenlerinin görüşleriyle belirlenmesi. *Uludağ Üniversitesi Eğitim Fakültesi Dergisi*, 25(2).
- 13. İkiz, A.E. (2007) Otistik Çocukların Gelişiminde, Resim-İş Eğitiminin Yeri Ve Önemi, Yayınlanmamış Yüksek Lisans Tezi, İstanbul: Marmara Üniversitesi
- 14. Köse, E. (2005), Özel eğitim gereksinimi olan çocukların gelişimine seramik eğitiminin etkisi. Yayınlanmamış yüksek lisans tezi, Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Ankara.
- 15. Özcan, M. (2015). Zihinsel Engelli Bireylerde Görsel Sanat Eğitimi. İstanbul Aydın Üniversitesi Güzel Sanatlar Fakültesi Dergisi, 1(2), 71-83.
- 16. Paksoy, S. (2003). 8-12 yaş eğitilebilir zihinsel engelli çocukların resim-iş eğitimi, Yayımlanmamış Yüksek Lisans Tezi, Marmara Üniversitesi Eğitim Bilimleri Enstitüsü, İstanbul.
- 17. Salderay, B. (2003). Zihinsel Engelli Bireyler İçin Güzel Sanatlar Eğitimi. *Milli Eğitim Bakanlığı: Bilim ve Aklın Aydınlığında Eğitim,* 39 (4) 32-33.

- 18. Salderay, B. (2014). Özel Eğitim Sürecinde Görsel Sanatlar Uygulamalarının Önemine İlişkin Aile Düşünce Yapılarının Değişimi. *Manas Sosyal Araştırmalar Dergisi*, 3 (3), 87-101.
- 19. Saldeyar, B.(2010a). Engelli Bireylerin Yapmış Olduğu Görsel Sanatlar Çalışmalarının Engelli Birey Aileleri Ve Engelli Bireylerle Çalışan Eğitimciler Tarafından Değerlendirilmesi. Erzincan: Erzincan Eğitim Fakültesi Dergisi, 12 (1).
- 20. Şahin, D. (2015). Zihin Engelli Bireylerde Görsel Sanatlar Eğitiminin Önemi. Sanat Eğitimi Dergisi, 3 (2), 25-37.
- 21. Şenel, H. G. (2009). Otizmli Bireylerle Akranlarının Spor ve Sanat Etkinlikleri Aracılığıyla Etkileşimde Bulundukları İki Örnek Uygulama. Ankara Üniversitesi Eğitim Bilimleri Fakültesi Özel Eğitim Dergisi, 10(2), 65-72.
- 22. Turan, A. (2004). Zihinsel Engellilerde Resim Eğitimi (*Basılmamış Yüksek lisans Tezi*). Konya: Selçuk Üniversitesi Sosyal Bilimler Enstitüsü.
- 23. Türe, N. (2007). Eğitimde ve Öğretimde Bir Araç Olarak Görsel Sanatlar Eğitiminin Öğrencilere Sağladığı Katkılar. Yayımlanmamış Yüksek Lisans Tezi, Selçuk Üniversitesi, Sosyal Bilimler Enstitüsü, Konya.
- 24. Ulutaş, İ. ve Ersoy, Ö. (2004). Okul Öncesi Dönemde Sanat Eğitimi. Kastamonu Eğitim Dergisi, 12(1), 1-12.
- 25. Yıkmış, A. ve Özbey, Y. F. (2009). Otistik Çocuğa Sahip Annelerin Çocuklarının Devam Ettiği Rehabilitasyon Merkezlerinden Beklentilerinin ve Önerilerinin Belirlenmesi. *International Online Journal of Educational Sciences*, 1 (1), 124-153.

#### Ayşe Çevirgen, Burcu Aktaş, Mehtap Kot THE INFLUENCE OF VISUAL ARTS EDUCATION ON CHILDREN WITH ASD

#### Creative Commons licensing terms

Authors will retain the copyright of their published articles agreeing that a Creative Commons Attribution 4.0 International License (CC BY 4.0) terms will be applied to their work. Under the terms of this license, no permission is required from the author(s) or publisher for members of the community to copy, distribute, transmit or adapt the article content, providing a proper, prominent and unambiguous attribution to the authors in a manner that makes clear that the materials are being reused under permission of a Creative Commons License. Views, opinions and conclusions expressed in this research article are views, opinions and conclusions of the author(s). Open Access Publishing Group and European Journal of Special Education Research shall not be responsible or answerable for any loss, damage or liability caused in relation to/arising out of conflict of interests, copyright violations and inappropriate or inaccurate use of any kind content related or integrated on the research work. All the published works are meeting the Open Access Publishing requirements and can be freely accessed, shared, modified, distributed and used in educational, commercial and non-commercial purposes under a Creative Commons Attribution 4.0 International License (CC BY 4.0).